

CLAIMS

Having thus described the preferred embodiment, the invention is now claimed to be:

5 1. A method of reducing errors resulting from a temporal shift between an analog pulse and digital sampling intervals, the method comprising:

10 digitally sampling the analog pulse at a plurality of spaced sampling intervals to generate a set of digital samples;

 determining an integral from the samples in the set;

 selecting a subset of the samples;

15 determining a correction factor corresponding to the subset of samples;

 applying the correction factor to the integral to generate a corrected integral value.

20 2. The method according to claim 1, further including:

 converting a photon of radiation into a scintillation;

 with a photomultiplier tube, converting the scintillation into the analog pulse.

25

 3. The method according to claim 1, further including:

 smoothing the analog pulse to reduce variation from a Gaussian distribution prior to the digital sampling.

30

 4. The method according to claim 1, wherein the digital sampling is at uniformly spaced time intervals.

 5. The method according to claim 1, wherein there are at least four samples in the set of digital samples.

6. The method according to claim 1, wherein the step of determining an integral includes summing the samples in the set.

5 7. The method according to claim 1, wherein selecting the subset includes selecting at least two samples in the set.

10 8. The method according to claim 1, wherein selecting the subset includes selecting three of the digital samples in the set.

9. The method according to claim 1, wherein the step of determining a correction factor includes:

15 concatenating the subset of digital samples; using the concatenation to address a correction factor look up table.

10. The method according to claim 9, further 20 including:

normalizing each of the samples in the subset to a maximum sample in the set of samples to form a normalized sample; and

25 multiplying each of the normalized samples by a factor which is the same for all samples in the subset.

11. The method according to claim 1, further including:

30 determining a start time of the analog pulse from the subset of digital samples.

12. The method according to claim 1, further including:

35 generating a correction table which assigns a correction factor for a plurality of codes, each of the codes corresponding to a relationship between a subset of samples

in a calibration signal which is similar in shape to the analog pulse.

13. The method according to claim 12, wherein generating a correction table includes:

5 for a plurality of calibration sample sets in which calibration pulses are shifted in time relative to a sampling interval:

10 sampling the calibration pulses at a plurality of spaced intervals to generate a set of digital samples;

determining an integration which is a function of the digital samples in the set;

selecting a subset of the digital samples;

15 determining a correction factor which relates the integration of the set of samples to an integration of a set of digital samples in which the first sample is taken at a fixed point of reference; and

20 assigning a code to the subset of digital samples which relates to a relationship amongst the samples in the subset and assigning the correction factor to the code.

25 14. The method according to claim 13, wherein the fixed point of reference is a start of the sampling interval.

15. The method according to claim 13, wherein assigning a code to the subset of predicted samples includes:

30 for each of the samples in the subset, converting the sample to an M-bit code; and

concatenating the M-bit code to an MxN bit code, where N is the number of samples in the subset.

35 16. The method according to claim 15, wherein converting the samples to an M-bit code includes:

normalizing each of the sample to a maximum sample in the set of predicted samples; and

5 multiplying the normalized sample by a factor which is the same for all samples in the subset of predicted samples.

17. A nuclear camera comprising:
at least one detector head which generates energy pulses in response to received radiation; and
10 a processor for integrating the pulses according to the method of **claim 1**.

18. A system for reducing temporal shift errors between an analog pulse and a digital sampling interval
15 comprising:

a means for digitally sampling the analog pulse at sampling intervals to generate a set of digital samples;
a means for determining an integral of the analog pulse from the set of digital samples;
20 a means for selecting a subset of the digital values;
a means for determining a correction factor from the subset of digital samples; and
a means for applying the correction to the
25 integral.

19. The system according to claim 18, wherein the means for sampling includes an analog to digital converter.

30 20. A system for reducing temporal shift errors between an analog pulse and a digital sampling interval comprising:

35 an analog to digital converter for sampling the pulse at intervals of time to generate a set of digital samples;

a correction table which assigns a correction factor to each of a plurality of codes, each of the codes

corresponding to a relationship amongst samples in a subset of calibration samples, each of the subsets of calibration samples being selected from a different set of calibration samples, wherein each of the sets of calibration samples are
5 shifted in time relative to a sampling interval; and

a processor for calculating an integral of the pulse from the digital values and the correction factor.

21. The system of claim 20, further including:
10 a source of radiation; and
a detector which detects the radiation, the detector including a photomultiplier tube which generates the pulse.